

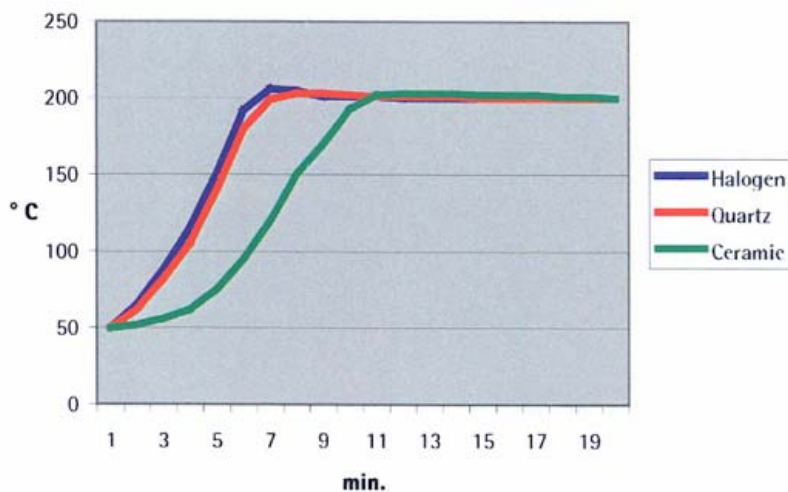
APPLICATION NOTE

Quartz versus Halogen for IR Moisture Analysis

Infrared moisture analyzers have had a variety of heating element materials over the last several decades. The two most common on today's market are quartz and halogen.

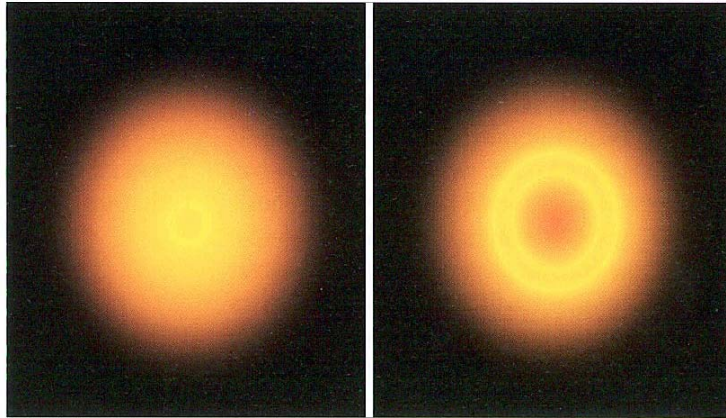
Over the last decade, Denver Instrument Company has chosen to use quartz heating elements in our products. Working with thousands of customers we have found quartz to be the most stable and provide the best results for a variety of different applications.

In the last five years halogen heating elements have become popular. Halogen's claim to fame has been that it heats up much more quickly than other types of heating elements. Below is a curve that shows typical heating behavior of several different types of heating elements. As the graph indicates, the new quartz heating element from Denver raises the bar by heating nearly as fast as halogen but without the negative side effects.



Halogen has the tendency to overshoot the desired temperature. Samples that are sensitive to heat or that lose components other than moisture at higher temperatures can burn or scorch during this period of higher temperature. The Denver units regulate the heating process better providing better reproducibility of analysis.

The other down side of halogen is the distribution of heat. The image below shows the typical heat distribution of quartz on the left and halogen on the right. It is evident that the temperature directly under the halogen heating element will be hotter than at the center or outside edge of sample pan. Quartz has much more even heating across the entire sample pan, providing each sample with even, controlled temperature distribution for steady, efficient drying.



Due to both the overshooting of the analysis temperature and the poor distribution of heat, many halogen customers report that out of a batch of samples at least one will have to be rerun. They have found that the few seconds saved on each analysis are negated by the time it takes to repeat a sample analysis.

Denver Instrument continues to stand by quartz technology. In 2005 we introduced the IR-60 and IR-120, which feature a new quartz design. The heating element is coiled around a specially designed material that quickly transfers heat to the quartz glass plate. The quartz plate evenly distributes the heat to the sample.

This latest quartz technology is as fast as halogen with the added advantage of even heat distribution.